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UNITED STATES DEPARTMENT OF AGRICULTURE FOREST SERVICE RO

REPLY TO: 3430 Evaluation DATE: October 10, 1984

SUBJECT: Results of 1983-1984 trials for control of Phoma blight of red fir at the Humboldt Nursery (Report No. 84-39)

TO: Forest Supervisor, Six Rivers National Forest

In 1982-1983, ten fungicides were evaluated for control of Phoma blight of red fir at the Humboldt Nursery. None of the fungicides tested were effective (reference 3430 Evaluation, Report No. 83-22, September 22, 1983). However, observations indicated that preventing or reducing soil cone formation would lessen the impact of the disease. Therefore, a second trial, using three fungicides in combination with a redwood mulch or shade frames to decrease rain splash, was conducted in 1983-1984. The procedure used and results of this second trial are presented below.

The trial was initiated in October, 1983. The efficacy of chlorothalonil, mancozeb, and tri-basic cooper sulfate (fungicides effective for a period of time in the 1982-1983 trial) were tested, alone, and in combination with a redwood mulch or shade cover (4 x 12 ft shade frames covered with lath). A split-plot design was used. The experiment was replicated five times down a bed of 1-0 red fir. Each replicate covered 72 ft of bed, and contained three (no mulch or cover, mulch, cover) 24 ft plots with four (chlorothalonil, mancozeb, tri-basic copper sulfate, control) 4 x 6 ft sub-plots in each plot. Plots and sub-plots were randomized in each replicate.

Fungicides were applied at approximately one month intervals at the same concentrations used in the 1982-1983 trial. Efficacy of treatments was evaluated by counting and removing dead seedlings at monthly intervals. In July 1984, all remaining seedlings were counted to obtain a total count per sub-plot, and percentage of seedlings killed in each treatment determined.

Results of the trial are presented in the following table:

PERCENTAGE OF RED FIR SEEDLINGS KILLED BY PHOMA AT THE HUMBOLDT NURSERY, 1983-1984 TRIAL

Cover[1]	Fungicide Treatment			
	None	Chlorothalonil	Mancozeb	Copper
None	20[a]	9	15	7
Lath	6[b]	4	6	5
Mulch	6[b]	3	5	4

[1] Means followed by the same letter are not significantly different (P = 0.05) according to Duncan's multiple range test.

When compared with no cover, the use of either a mulch or lath cover significantly reduced the incidence of Phoma blight. Under the conditions of this trial, the two cover treatments reduced rain splash and subsequent soil cone formation when compared with bare ground. This observation, along with a significant reduction of disease incidence in the covered plots, confirms previous assumptions that Phoma blight at Humboldt is directly related to the formation of soil cones during periods of heavy rain throughout the winter months.

No significant differences among fungicide treatments were found. When compared with no fungicide treatment, none of the three fungicides tested, in combination with either no cover or with a mulch or lath cover, significantly reduced the number of seedlings killed by Phoma.

However, overall levels of Phoma blight in the test bed were low (7.7% in five replicates) and disease developed to a significant extent in only one replicate (16.6% vs. 5.5% in the other four replicates). Although higher levels of disease incidence in the one replicate did occur in the plot with no cover than in the covered plots, disease first occurred in the sub-plot with no fungicide treatment. This observation suggests that, during years more conducive to disease or when disease first appears, the use of a fungicide may well be beneficial.

A similar trial will be conducted in 1984-1985. Inoculation of the test bed with Phoma-infested soil may insure a more uniform chance for disease development in all replicates and provide a better test for determining the relative efficacy of fungicides.

At this time we recommend the nursery apply a 1/2" redwood mulch to beds of 1-0 red fir, white fir, and Douglas-fir prior to the winter rainy period. This mulch should be made up of chips from the size of saw kerf to chips 1/16" x 1/2" x 1/2". The nursery may wish to run a series of pilot tests to determine the best time of application. If so, we would be available for consultation and help in evaluation.

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